

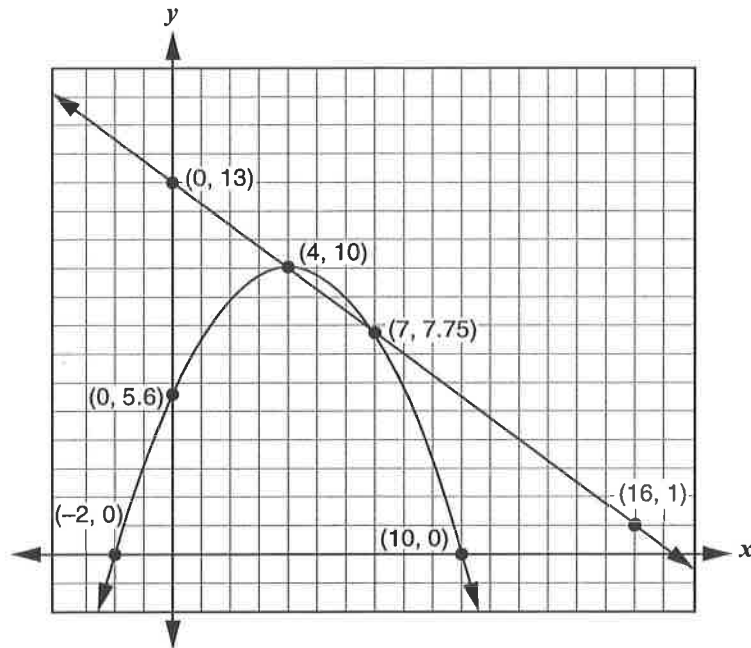
**Directions to the Student**

Today you will be taking Session I of the Missouri Algebra I Test. This is a test of how well you understand the course level expectations for Algebra I.

**There are several important things to remember:**

- 1** Read each question carefully and think about the answer. Then choose the answer that you think is best.
- 2** Make sure you clearly mark the correct choice in your test book.
- 3** If you do not know the answer to a question, skip it and go on. You may return to it later if you have time.
- 4** If you finish the test early, you may check over your work.

1. A system of equations is graphed below.



What are the solutions to the system?

- A.  $(0, 5.6)$  and  $(0, 13)$
- B.  $(0, 13)$  and  $(16, 1)$
- C.  $(4, 10)$  and  $(7, 7.75)$
- D.  $(16, 1)$  and  $(10, 0)$



3. Kelli recorded the amount of money she earned,  $y$ , for hours worked,  $x$ , in the table shown. Select the words that correctly complete the sentences.

Hours Worked ( $x$ )	Dollars Earned ( $y$ )
1	\$15
3	\$45
4	\$60

The function is \_\_\_\_\_.

- increasing  
 decreasing

The function is \_\_\_\_\_.

- linear  
 quadratic  
 exponential

The  $y$ -intercept is \_\_\_\_\_.

- (1, 15)  
 (0, 1)  
 (0, 0)

4. The table shows the distances that schools will travel to attend a field trip to the state capitol. School 7 has to travel 15 miles. If this outlier is added to the data, which is a true statement about how it changes the data in the table? Select all statements that apply.

Distances Traveled

School	Distance Traveled (miles)
School 1	425
School 2	150
School 3	400
School 4	380
School 5	200
School 6	380

- A. The data is less spread.
- B. The data is more spread.
- C. Both the median and the mean change.
- D. There is no change in the median and mean.
- E. There is no change in the spread of the data.
- F. The median stays the same, and the mean changes.
- G. The median changes, and the mean stays the same.

5. The formula for the area of a trapezoid is  $A = \frac{1}{2}(b_1 + b_2)h$ . Solve for  $b_1$ . Which equation is a correct value for  $b_1$ ?

A.  $b_1 = \frac{(2A - b_2)}{h}$

B.  $b_1 = \frac{2A}{h} - b_2$

C.  $b_1 = \frac{A}{2h} - b_2$

D.  $b_1 = \frac{\frac{1}{2}A - b_2}{h}$

$$2 \cdot A = \frac{(b_1 + b_2)h}{2} \cdot 2$$

$$2A = (b_1 + b_2)h$$

$$2A = hb_1 + hb_2$$

$$\begin{array}{r} -hb_2 \qquad \qquad -hb_2 \\ \hline \end{array}$$

$$\frac{2A}{h} - \frac{hb_2}{h} = \frac{hb_1}{h}$$

$$\frac{2A}{h} - b_2 = b_1$$

6. The area, in square units, of a rectangle is represented by  $6x^3 - 2x^2 + 4x$ . If the width, in units, is  $2x$ , what is the length, in units?

Enter the expression that represents the length, in units, in the box.

$$\frac{6x^3}{2x} - \frac{2x^2}{2x} + \frac{4x}{2x} \quad \boxed{3x^2 - x + 2}$$

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7. Which student correctly solved this expression?

$$x^{\frac{1}{3}} \cdot x^{\frac{1}{4}}$$

- A. Jo says the answer is  $x^{\frac{7}{12}}$  because the exponents should be added.
- B. Kerrie says the answer is  $x^{\frac{2}{7}}$  because the exponents should be added.
- C. Alex says the answer is  $x^{\frac{7}{12}}$  because the exponents should be multiplied.
- D. Tracy says the answer is  $x^{\frac{1}{12}}$  because the exponents should be multiplied.



8. Which of the following is the best method for solving  $x^2 + 2x + 3 = 0$ ?
- A. factor
  - B. inspection
  - C. quadratic formula
  - D. square root property

9. Which ordered pair(s) satisfy the function  $f(x) = -x^2 + 2$ ?  
Select all that apply.

A. (-1, 1)

B. (-1, -1)

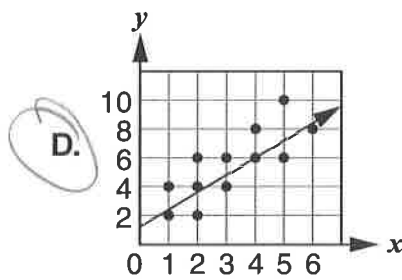
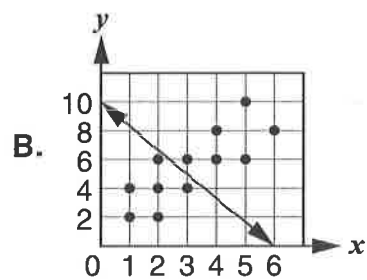
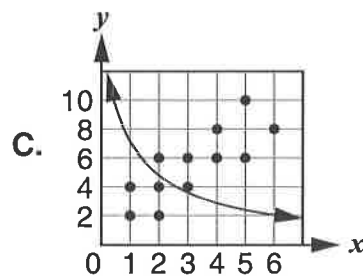
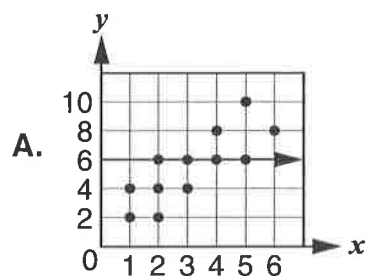
C. (-2, -2)

D. (2, -2)

E. (-2, 2)

-2	-2
-1	1
0	2
1	1
2	-2

10. A residual is defined as the difference between the actual value of the dependent variable and the value predicted by the model. Which graph best represents a relationship that minimizes residuals?



11. The ordered pairs in the table are possible solutions to the given equations.

Match each ordered pair to the equation for which it is a solution. Ordered pairs may be used more than once.

	$-2x + 5y = 10$	$y = 2(3)^x$	Neither
$(-5, 0)$	X		
$(0, -5)$			X
$(0, 2)$	X	X	
$(1, 6)$		X	

$$-2(-5) + 5(0) = 10 \checkmark$$

$$-2(0) + 5(-5) = 10 \times$$

$$-2(0) + 5(2) = 10 \checkmark$$

$$-2(1) + 5(6) = 10 \times$$

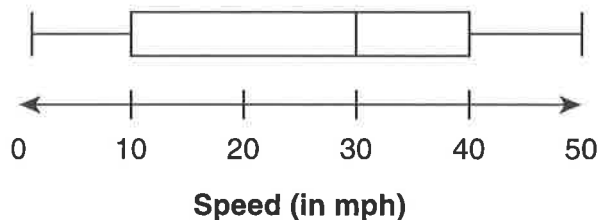
$$0 = 2(3)^{-5} \times$$

$$-5 = 2(3)^0 \times$$

$$2 = 2(3)^0 \checkmark$$

$$6 = 2(3)^1 \checkmark$$

12. A police department captured 30 speeds on radar and organized their data in the box plot shown.



What can be inferred from the data? Select all that apply.

- A. The mean is equal to the median.
- B. The mean is probably less than 30 mph.
- C. The mean is probably more than 30 mph.
- D. If an officer captures an additional speed of 70 mph, the mean must change.
- E. If an officer captures an additional speed of 70 mph, the median must change.

13. Which equation completes the square to create an equivalent to  $x^2 + 10x + 13 = 0$  in the form of  $(x - p)^2 = q$ ?

A.  $(x - 5)^2 = 12$

B.  $(x + 5)^2 = 12$

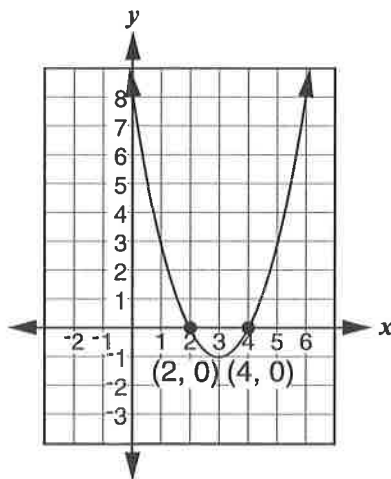
C.  $(x + 5)^2 = 25$

D.  $(x - 5)^2 = 25$

$$x^2 + 10x + \underline{25} = -13 + \underline{25}$$

$$(x + 5)^2 = 12$$

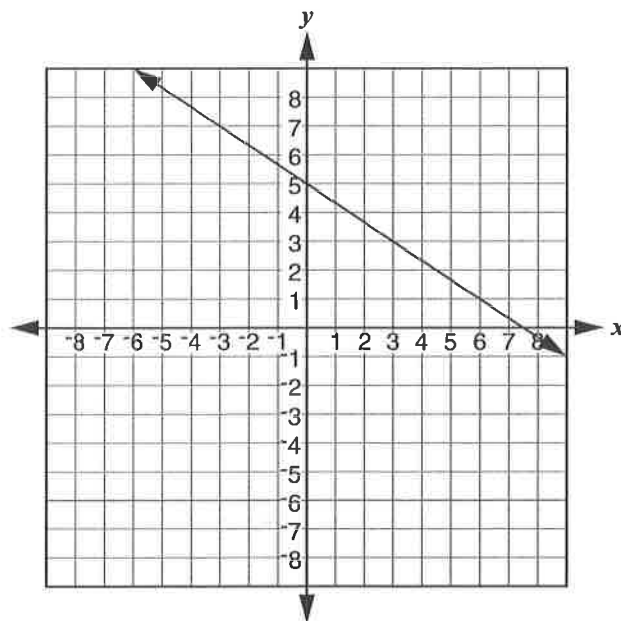
14. Which of the equations are represented by the graph shown?  
Select all that apply.



- A.  $y = (x - 2)(x - 4)$      $x^2 - 6x + 8$   
 B.  $y = (x - 3)^2 - 1$      $x^2 - 6x + 9 - 1$   
 C.  $y = (x - 3)^2 + 1$   
 D.  $y = x^2 - 6x + 8$   
 E.  $y = x^2 + 6x + 8$

Go On ►

15. The graph of a linear equation is shown.

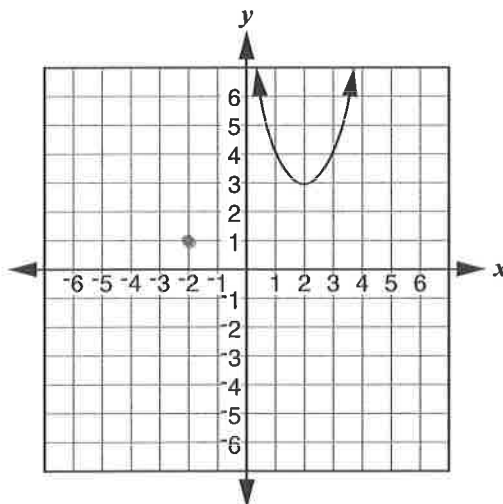


What equation represents the graph shown? In the box, enter an equation that represents the graph.

$$y = -\frac{2}{3}x + 5$$



16. The quadratic function  $f(x)$  is shown in the graph below.



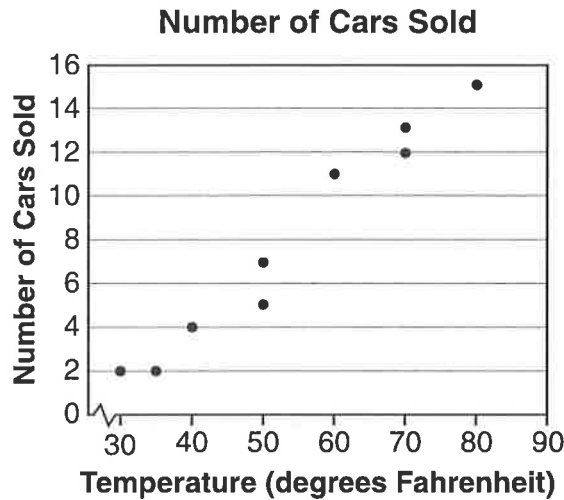
If the graph of  $f(x)$  is moved left 4 units and down 2 units, what would be the equation for the new graph in vertex form?

- A.  $f(x) = (x - 4)^2 - 2$   
 B.  $f(x) = (x - 1)^2 + 2$   
 C.  $f(x) = (x + 4)^2 - 2$   
 D.  $f(x) = (x + 2)^2 + 1$

$(-2, 1)$

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17. A car sales business is analyzing the number of cars sold and the average daily high temperature. The data is shown on the graph below.



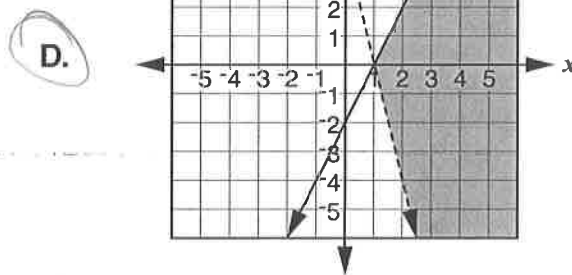
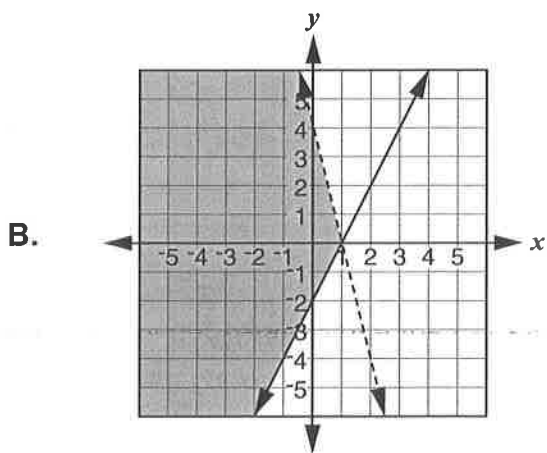
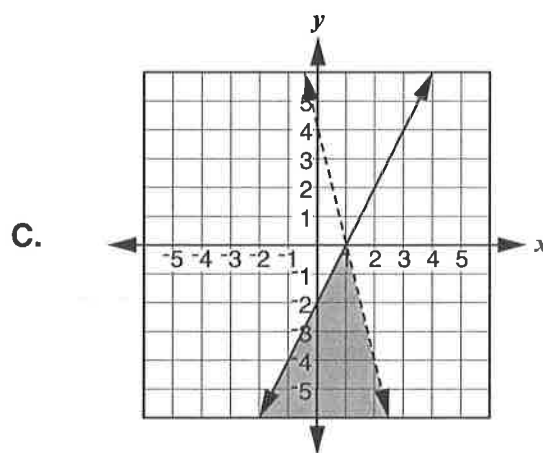
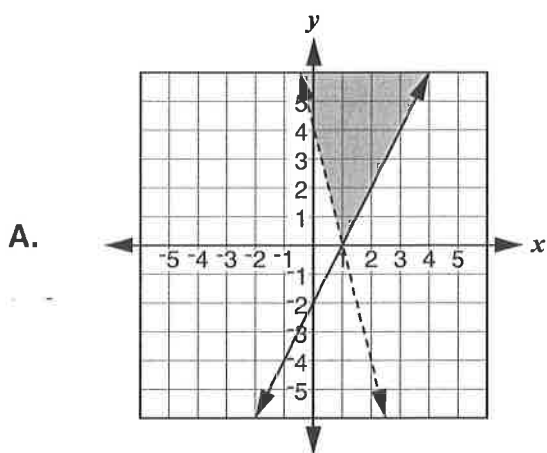
Which statement is correct based on the data?

- A. The temperature gives no indication of car sales.
- B. If the temperature is 50, the amount of car sales will definitely be 4 cars.
- C. The higher temperature is correlated to higher car sales and causes the car sales to increase.
- D. The higher temperature is correlated to higher car sales, but does not necessarily cause the car sales to increase.

18. Select the graph that shows the solutions to the system of linear inequalities.

$$y \leq 2x - 2$$

$$y > -4x + 4$$



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19. The following question has two parts. First, answer Part A. Then, answer Part B.

Riley needs to save \$300 for a computer. She gets an allowance of \$10 a week and has already saved \$75.

Part A

How many weeks,  $x$ , until Riley will have enough money to buy the computer? Select the correct symbol to model the situation.

$$300 \underline{\quad} 10x + 75$$

$>$

$<$

$=$

Part B

What is the value that is a solution to the situation in Part A?

A. 20

B. 21

C. 22

D. 23

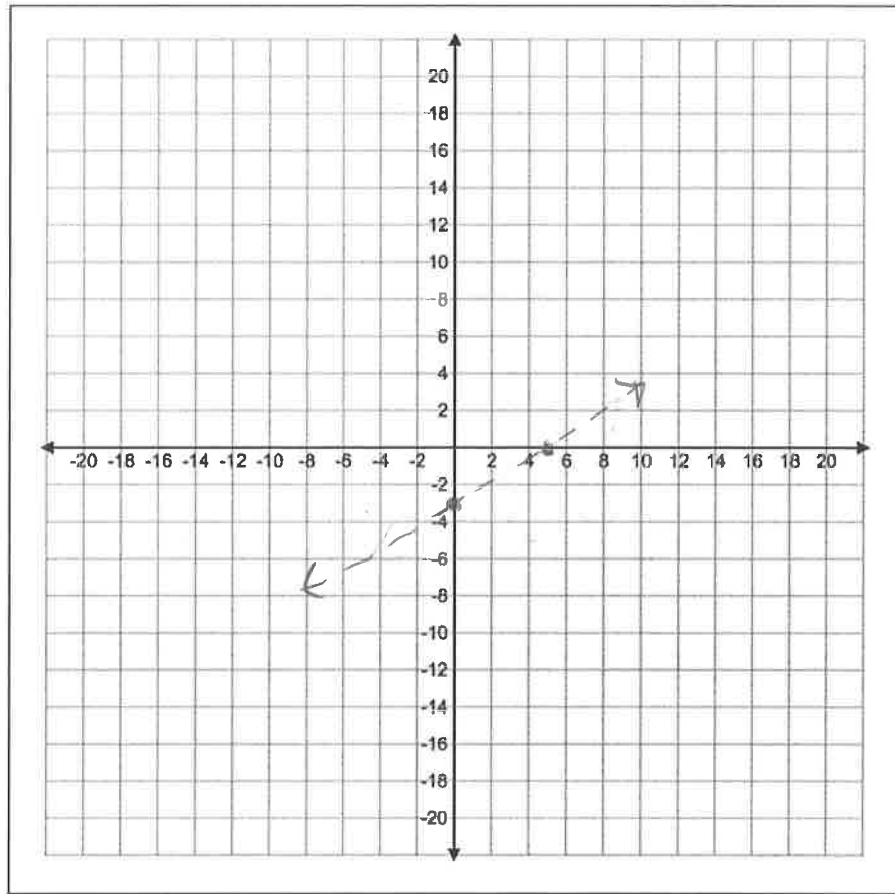
20. The following function was used to calculate the profit generated by selling T-shirts.

Let  $f(x) = 15x - 25$  represent the profit function and  $x$  represent the number of T-shirts sold. Which statement is true of  $f(200)$ ?

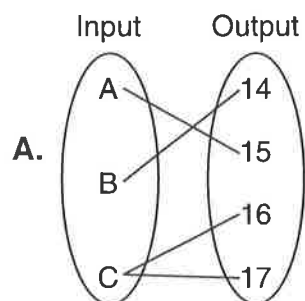
- A. It results in 15 and means that 15 T-shirts were sold.
- B. It results in 15 and means that \$15 was made in profit.
- C. It results in 2,975 and means that 2,975 T-shirts were sold.
- D. It results in 2,975 and means that \$2,975 was made in profit.

21. Graph the inequality  $\frac{5y}{5} < \frac{3x}{5} - \frac{15}{5}$ .

$$y < \frac{3}{5}x - 3$$

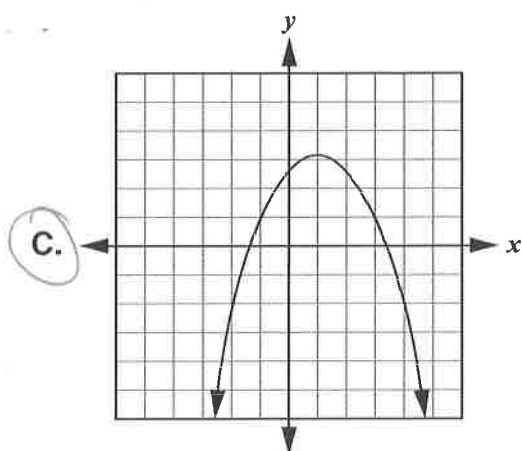


22. Which of the following relations represent functions?  
 Select all that apply.

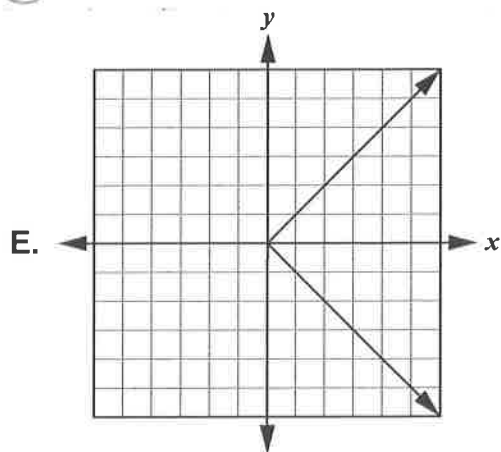


B.

$x$	-2	-1	0	1	2
$y$	3	3	3	3	3



D.  $f(x) = 3x + 1$



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23. A student graphs  $f(x) = x^2$  and then graphs  $g(x) = x^2 + 5$ .

Select the word that correctly completes the sentence.

The graph of  $g(x)$  will be shifted \_\_\_\_\_ 5 units from the graph of  $f(x)$ .

- up
- down
- right
- left



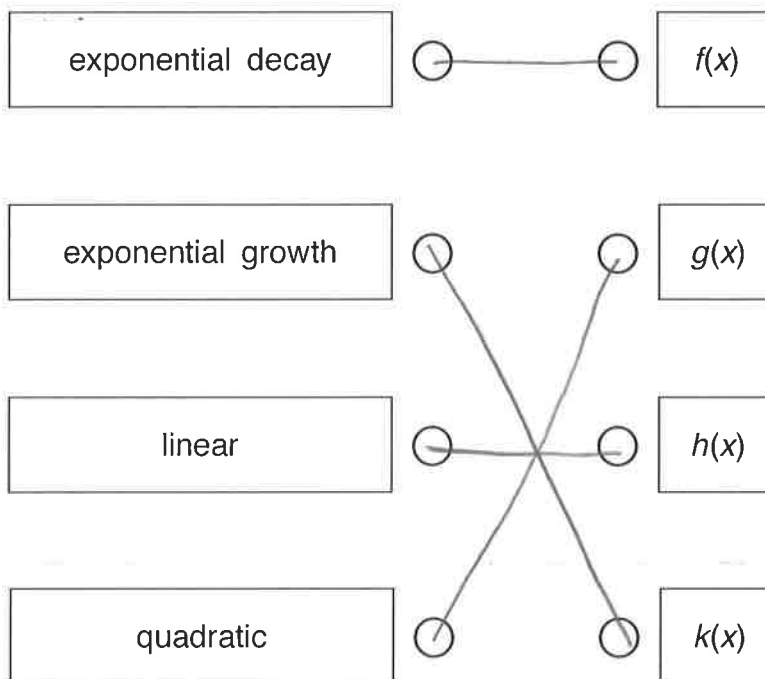
24. Draw a line from each function type to the function shown in each table.

$x$	$f(x)$
-3	8
-2	4
-1	2
0	1

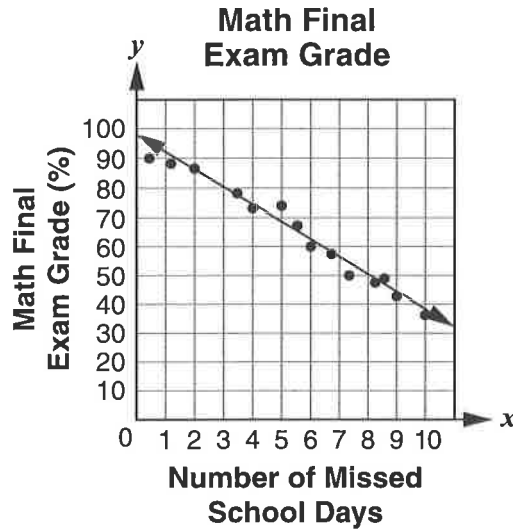
$x$	$g(x)$
-1	3
0	1
1	1
2	3

$x$	$h(x)$
2	4
3	$\frac{9}{2}$
4	5
5	$\frac{11}{2}$

$x$	$k(x)$
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2



25. Which of the following statements describe the linear model shown? Select all that apply.



- A. The number of days missed has no correlation to a student's final exam grade.
- B. A student with perfect attendance is expected to score approximately 98% on the math final.
- C. A student with perfect attendance is expected to score approximately 38% on the math final.
- D. For each day a student is absent, that student's final exam score is expected to decrease approximately 6 percentage points.
- E. For every sixth day a student is absent, that student's final exam score is expected to decrease approximately 1 percentage point.

26. Compare  $f(x) = x^2 - 2x - 3$  and  $g(x)$ . Function  $g(x)$  is shown below.

$x$	$g(x)$
0	3
1	0
2	-1
3	0
4	3

Match the property with its corresponding function. A property may match one function, both functions, or neither function.

	Function $f(x)$	Function $g(x)$	Neither Function
Minimum of -1		X	
Minimum of -4	X		
Zero at -1	X		
Zero at 1		X	
Zero at 2			X
Zero at 3	X	X	

Go On ►

27. Which tables represent linear functions? Select all that apply.

**A.**

$x$	$y$
1	-2
2	-5
3	-8
4	-11
5	-14

**D.**

$x$	$y$
1	81
2	27
3	9
4	3
5	1

**B.**

$x$	$y$
1	2
2	4
3	8
4	16
5	32

**E.**

$x$	$y$
1	1.5
2	3.0
3	4.5
4	6.0
5	7.5

**C.**

$x$	$y$
1	17
2	21
3	25
4	29
5	33

**F.**

$x$	$y$
1	6
2	9
3	14
4	21
5	30

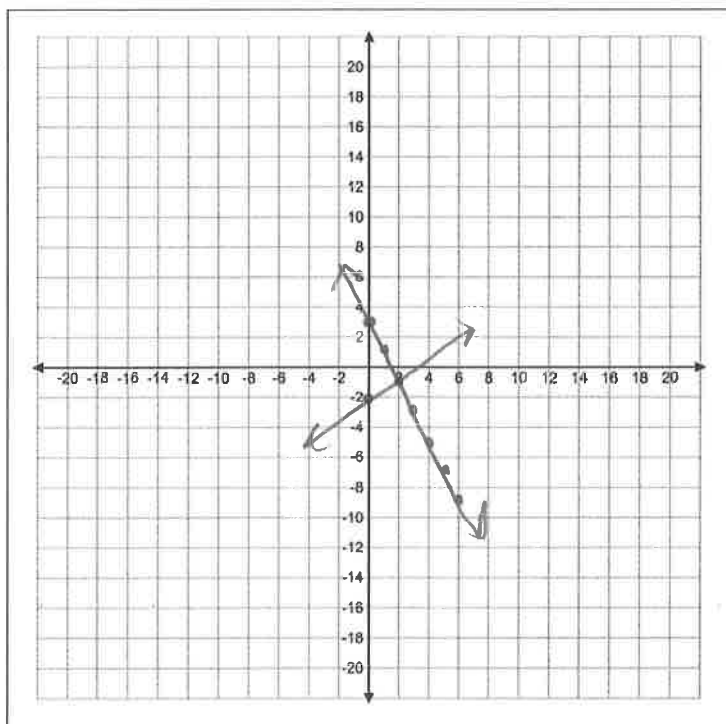
28. The following question has two parts. First, answer Part A. Then, answer Part B.

Johnathan is trying to solve the system of equations:

$$\begin{cases} y = -2x + 3 \\ y = \frac{1}{2}x - 2 \end{cases}$$

**Part A**

Graph the system of equations.



**Part B**

What is the solution to the system?

Solution: (  ,  )

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29. The following scatterplots show relationships between two variables. Draw a line from the correct correlation coefficient to each graph.

$r = 0.80$



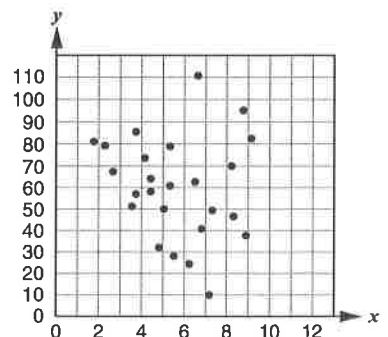
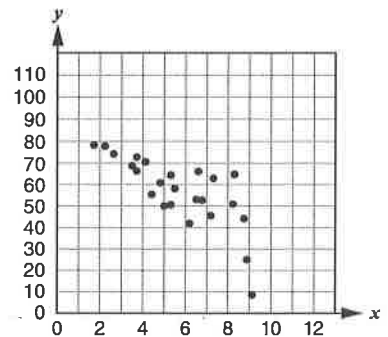
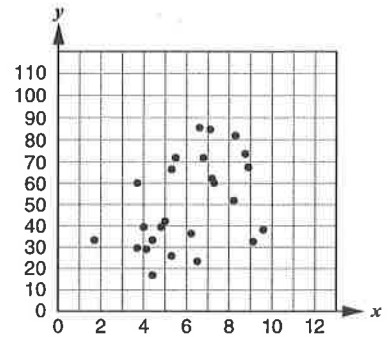
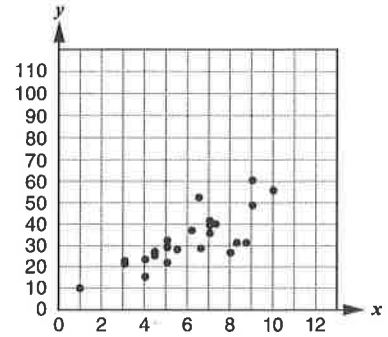
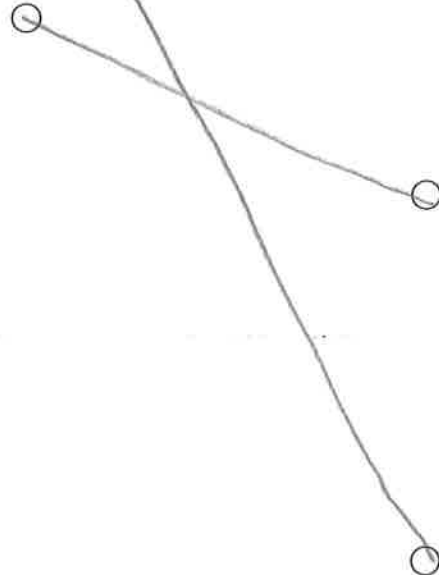
$r = 0.43$



$r = -0.14$



$r = -0.76$



STOP